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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,137	10/08/2003	Shriram Ramanathan	42P17285	1352

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EXAMINER

POTTER, ROY KARL

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/682,137	<b>Applicant(s)</b> RAMANATHAN ET AL.	
	<b>Examiner</b> Roy K. Potter	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 28-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8,10,11,13,14,21,22 and 24-27 is/are rejected.
- 7) ☒ Claim(s) 2,3,7-10,12,15-20 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

Applicant's election without traverse of claims 1 - 27 in the reply filed on 2/11/05 is acknowledged. Claims 28 – 40 have been canceled.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 3 – 6, 8, 10 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "the thermoelectric components" in line 3. There is insufficient antecedent basis for this limitation in the claim. There is antecedent basis for thermoelectric elements. Dependent claim 4 also recites thermoelectric components. Claims 5 and 6 are dependent on claim 4.

Claim 8 also recites the limitation "the limitation the thermoelectric components" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "two interconnection elements" in line 5. There is insufficient antecedent basis for this limitation in the claim. It is unclear what these elements are interconnecting or where they are located.

Claim 10 recites the limitation "each conductive interconnection element" in line 3. There is insufficient antecedent basis for this limitation in the claim.

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Claim 13 recites the limitation "the thermoelectric components" in lines 1 - 2.

There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 4 – 6, 11, 13, 14, 21, 22, 24, 25, are rejected under 35 U.S.C. 102(a) as being anticipated by Cordes et al..

Cordes et al., U.S. Patent No. 6,614,109, discloses a method and apparatus for thermal management of integrated circuit. As shown I Figure 2c, integrated circuits are formed in semiconductor layer 309 of a substrate 302. These form a die. A plurality of or thermoelectric elements, 328, 330, 358, 360 are formed on the die to pump heat away form the die when current flows through the thermoelectric elements. In regard to claim 8, Cordes et al. teaches that the thermoelectric elements are in [pairs of p-doped and n-doped types with a plurality of link elements, 322, 324, 348, and 350. The link elements also serve as die lands and are formed of copper sandwiched between platinum diffusion barrier layers, as explained in column 4, beginning on line 58. Carrier substrate 338 with the die mounted to the carrier substrata and the thermoelectric elements electrically connected to the carrier substrate to receive power supplied at electrode 370.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cordes et al. in view of Morris et al..

Cordes does not disclose or suggest a thermally conductive plate with the thermoelectric elements between the die and the plat, as recited in claim 25.

Morris et al., U.S. Patent 6,230,497 discloses a semiconductor circuit temperature monitoring and controlling apparatus. As shown in Figure 1, a die 22 comprises a semiconductor circuit. A plurality of thermo-electric cells 24, described in column 3, line 12, pump heat away form the die when current flows through the thermoelectric elements. As shown in Figure 1, a thermally conductive plate with fins is attached to the opposite side of the thermoelectric elements of the cooling section.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a thermally conductive plate as in Morris et al. in the device of Cordes at al, because Morris teaches such a plate as a way to eliminate heat from the area that Cordes shows labeled for "heat rejection" in Figure 2C.

***Allowable Subject Matter***

Claims 2, 7, 9, 12, 15-20, 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In regard to claims 2 and 9, 23, the prior art does not teach that the thermoelectric elements are formed with the integrated circuit between the elements and the die.

In regard to claims 3 and 9, the prior art does not teach that the power is provided through the thermoelectric components to a power plane included in the integrated circuit.

In regard to claims 7, 9, 12, the prior art does not teach or suggest surrounding the thermoelectric elements with dielectric material.

In regard to claim 15, the prior art does not teach or suggest the recited carrier substrate lands with wire bonding wires. Claims 16 and 17 are dependent on claim 15.

In regard to claim 18, the prior art does not teach or suggest the recited plurality of interconnection elements with the integrated circuit between them and the die substrate. Claims 19 and 20 are dependent on claim 18.

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Claims 5 – 6, 8 and 10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson et al., U.S. Patent No. 6,262,357 discloses thermoelectric devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roy K. Potter whose telephone number is 571 72 1842. The examiner can normally be reached on M-F.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Roy K Potter  
Primary Examiner  
Art Unit 2822